

REMARKS

Claims 16 through 31 are pending in the application. Claims 1 through 4 are rejected under 35 U.S.C. § 102(e) as described on page 3 of the Office Action. Claims 11 and 12 were rejected under 35 U.S.C. § 103 as described on page 4 of the Office Action. Claims 5 through 10 and 13 through 15 were rejected under 35 U.S.C. § 103 as described on pages 4 and 5 of the Office Action. Claims 16, 20, 27, and 29 are the only independent claims.

Specification has been amended to place the application in correct idiomatic English.

Attached hereto is a replacement formal drawing of Fig. 1, wherein "118" has been deleted therefrom. Accordingly, it is respectfully requested that the objection to the drawings be withdrawn.

It is respectfully submitted that the outstanding objection and rejections to the claims are moot, as claims 1 through 15 have been cancelled.

It is respectfully submitted that claims 16 through 31 are patentable over the prior art of record for the following reasons.

The present invention relates to a laser diode drive circuit having a temperature compensation circuit and an optical transmission system.

It is an object of the present invention to provide a laser diode drive circuit capable of achieving compensation for degradation caused by a rapid change in the ambient temperature on operation performed over an extended period of time.

In accordance with one aspect of the present invention, the amount of current supply to the laser diode is adjusted using a voltage.

Newly added independent claim 16 is drawn to a laser diode drive circuit comprising a laser diode, an adjustment circuit, and a temperature compensation circuit. The adjustment circuit of claim 16 is required to be operable to "generate a first voltage according to an amount of light admitted by said laser diode and to store a first voltage value based on the first voltage." Further, the temperature compensation circuit of claim 16 is required to be operable to "generate a second voltage according

to an ambient temperature, **to generate a third voltage based on the first and second voltages and to adjust the current based on the third voltage.**"

Newly added independent claim 27 is drawn to an optical transmission system comprising a laser diode drive circuit including that which is required in independent claim 16 in addition to a control device. Specifically, the control device of claim 27 is required to be operable to, *inter alia*, "regularly update the first voltage value stored in said adjustment circuit."

Newly added independent claim 29 is drawn to an optical transmission system comprising a laser diode drive circuit such as required in independent claim 20 in addition to a control device. Specifically, the control device of claim 29 is required to be operable to, *inter alia*, "regularly update a first voltage value based on the first voltage in a data storage unit."

It is respectfully submitted that neither Nakano nor Salter et al., either singly or in combination, teaches the above identified limitations.

Nakano discloses a laser diode driving method for causing a laser diode to emit light wherein the light from the laser diode is adjusted in accordance with the ambient temperature. Specifically, as discussed in Nakano, the amount of current supplied to the laser diode is adjusted by using currents I_{ac} , I_{dc} and I_r , for example as illustrated in Fig. 2. Further, three current controllers 40 through 42 are necessary to generate the currents I_{ac} , I_{dc} and I_r .

However, Nakano fails to teach or suggest a temperature compensation circuit as required in independent claims 16 and 27. Specifically, Nakano fails to teach or suggest that temperature compensation adjusts current to the laser diode based on a third voltage, which is based on both a first voltage according to amount of light emitted from the laser diode and a second voltage according to an ambient temperature.

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed in a prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir. 1986), based on the foregoing, it is clear that Nakano does not anticipate claims 16 and 27.

Furthermore, since claims 17 through 19 and 28 are dependent upon claims 16 and 27, respectively, and therefore include all limitations thereof, Applicant submits that claims 17 through 19 and 28 additionally are not anticipated by Nakano.

In view of the above remarks, Applicant respectfully submits that claims 16 through 19, 27 and 28 are not anticipated by Nakano under 35 U.S.C. § 102(e).

It is respectfully submitted that Salter et al. fails to teach the shortcomings of Nakano such that a combination of the teachings of Nakano in view of Salter et al. would teach that which is required in claims 16 through 19, 27 and 28.

As discussed on page 4 of the Office Action, Salter et al. is relied upon for a teaching of "a drive circuit including such elements 24-28." As Salter et al. fails to discuss an item 26 it seems that Salter et al. is relied upon for a teaching of a minimum level monitoring circuit 24, a peak monitoring circuit 25 and comparators 27 and 28. Nevertheless, it is respectfully submitted that Salter et al. fails to teach the temperature compensation circuit as required in each of claims 16 and 27 as discussed above. Accordingly, it is respectfully submitted that a combination of the teachings of Nakano in view of Salter et al. would additionally fail to teach that which is required in each of independent claims 16 and 27.

In view of the above remarks, Applicant respectfully submit that claims 16 through 19, 27 and 28 would not have been obvious over the combination of Nakano in view of Salter et al. within the meaning of 35 U.S.C. § 103.

Newly added independent claim 20 is drawn to a laser diode drive circuit comprising a laser diode, an adjustment circuit, and a temperature compensation circuit. In particular, the adjustment circuit of claim 20 is required to comprise a "bottom detection circuit operable to detect a bottom voltage of a first voltage generated based on an amount of light emitted by said laser diode and a peak detection circuit operable to detect a peak voltage of the first voltage." Furthermore, the adjustment circuit of claim 20 is required to be operable to "generate a second voltage based on a difference between the bottom voltage and the peak voltage." Still further, the temperature compensation circuit of claims 20 is required to be operable to "**generate a third voltage based on an ambient**

temperature, to generate a fourth voltage based on the second and third voltages and to adjust the current based on the third voltage."

Newly added independent claim 29 is drawn to an optical transmission system comprising a laser diode drive circuit such as required in independent claim 20 in addition to a control device. Specifically, the control device of claim 29 is required to be operable to, *inter alia*, "regularly update a first voltage value based on the first voltage in a data storage unit."

As discussed on page 4 of the Office Action, Nakano fails to disclose an amplitude detection circuit comprising a bottom detector, a peak detector and a differential amplifier.

It is respectfully submitted that a combination of the teachings of Nakano and Salter et al. would fail to teach that which is required in independent claims 20 and 29.

Salter et al. discloses a minimum level monitoring circuit 24 and a peak monitoring circuit 25 connected to a feedback photodiode 23, as illustrated in Fig. 3. However, Salter et al. fails to disclose: 1) that the adjustment circuit generates a second voltage according to a difference between the bottom voltage and the peak voltage; and 2) that temperature compensation adjusts according to the third voltage, as required in each of independent claims 20 and 29.

Accordingly, even if a person of ordinary skill in the art at the time of invention were to modify the teachings of Nakano with the teachings of Salter et al., the combined teachings would fail to teach that the adjustment circuit generates a second voltage according to a difference between the bottom voltage and the peak voltage and would fail to teach that temperature compensation adjusts the current according to the third voltage, as required in each of independent claims 20 and 29.

In view of the above remarks, Applicant respectfully submits that claims 20 through 26 and 29 through 31 are patentable over the combination of Nakano in view of Salter et al. within the meaning of 35 U.S.C. § 103.

Having fully and completely responding to the Office Action, Applicant submits that all of the claims are now in condition for allowance, an indication of which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's Amendment, the Examiner is requested to call Applicant's attorney at the telephone number shown below.

Respectfully submitted,

Takayuki TANAKA

By: 

Thomas D. Robbins
Registration No. 43,369
Attorney for Applicant

TDR/jlg
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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